**AMENDMENTS TO THE CLAIMS**

Please cancel Claims 1-12, 15 and 16 and amend Claims 13, 14, 17 and 18 as indicated below.

1. – 12. (Cancelled)

13. (Currently Amended) A method of fabricating trench isolation structures between integrated electrical devices in a semiconductor substrate, comprising:

placing a semiconductor substrate in a reaction chamber, the semiconductor substrate comprising trenches; and

completely filling the trenches with insulating material by atomic layer deposition to form a trench isolation structure, the atomic layer deposition process comprising a plurality of primary cycles, each primary cycle comprising, in sequence:

introducing a first vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a first reactant species conforming at least to surfaces of the trenches;

removing excess first vapor-phase reactant and byproduct from the reaction chamber;

introducing a second vapor-phase reactant to the substrate, thereby reacting with the first reactant species conforming at least to the surfaces of the trenches; and

removing excess second vapor-phase reactant and byproduct from the reaction chamber,

wherein filling the trenches further comprises a plurality of secondary cycles, each secondary cycle comprising, in sequence:

introducing a third vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a third reactant species conforming at least to surfaces of the trenches, the third reactant species being different from the first reactant species;

removing excess third vapor-phase reactant and byproduct from the reaction chamber;

introducing a fourth vapor-phase reactant to the substrate, thereby reacting with the third reactant species conforming at least to the surfaces of the trenches; and

removing excess fourth vapor-phase reactant and byproduct from the reaction chamber,

wherein the primary cycles deposit silicon oxide and the secondary cycles deposit aluminum oxide and ~~The method of Claim 12, wherein~~ filling the trench comprises depositing aluminum oxide to form the insulating material comprising silicon oxide and between about 26% and 34% aluminum oxide by weight.

14. (Currently Amended) A method of fabricating trench isolation structures between integrated electrical devices in a semiconductor substrate, comprising:

placing a semiconductor substrate in a reaction chamber, the semiconductor substrate comprising trenches; and

completely filling the trenches with insulating material by atomic layer deposition to form a trench isolation structure, the atomic layer deposition process comprising a plurality of primary cycles, each primary cycle comprising, in sequence:

introducing a first vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a first reactant species conforming at least to surfaces of the trenches;

removing excess first vapor-phase reactant and byproduct from the reaction chamber;

introducing a second vapor-phase reactant to the substrate, thereby reacting with the first reactant species conforming at least to the surfaces of the trenches; and

removing excess second vapor-phase reactant and byproduct from the reaction chamber,

wherein filling the trenches further comprises a plurality of secondary cycles, each secondary cycle comprising, in sequence:

introducing a third vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a third reactant species

conforming at least to surfaces of the trenches, the third reactant species being different from the first reactant species;

removing excess third vapor-phase reactant and byproduct from the reaction chamber;

introducing a fourth vapor-phase reactant to the substrate, thereby reacting with the third reactant species conforming at least to the surfaces of the trenches; and

removing excess fourth vapor-phase reactant and byproduct from the reaction chamber,

wherein the primary cycles deposit silicon oxide and the secondary cycles deposit aluminum oxide and ~~The method of Claim 12, wherein~~ filling the trench comprises depositing aluminum oxide to form the insulating material comprising silicon oxide and between about 23% and 37% aluminum oxide by weight.

15. – 16. (Cancelled)

17. (Currently Amended) A method of fabricating trench isolation structures between integrated electrical devices in a semiconductor substrate, comprising:

placing a semiconductor substrate in a reaction chamber, the semiconductor substrate comprising trenches; and

completely filling the trenches with insulating material by atomic layer deposition to form a trench isolation structure, the atomic layer deposition process comprising a plurality of primary cycles, each primary cycle comprising, in sequence:

introducing a first vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a first reactant species conforming at least to surfaces of the trenches;

removing excess first vapor-phase reactant and byproduct from the reaction chamber;

introducing a second vapor-phase reactant to the substrate, thereby reacting with the first reactant species conforming at least to the surfaces of the trenches; and

removing excess second vapor-phase reactant and byproduct from the reaction chamber

filling the trenches further comprises a plurality of secondary cycles, each secondary cycle comprising, in sequence:

introducing a third vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a third reactant species conforming at least to surfaces of the trenches, the third reactant species being different from the first reactant species;

removing excess third vapor-phase reactant and byproduct from the reaction chamber;

introducing a fourth vapor-phase reactant to the substrate, thereby reacting with the third reactant species conforming at least to the surfaces of the trenches; and

removing excess fourth vapor-phase reactant and byproduct from the reaction chamber

wherein the primary cycles deposit a first oxide species and the secondary cycles deposit a second oxide species, at least a portion of the first and second oxide species combine to form a separate phase in equilibrium with a portion of the first oxide, and the separate phase comprises mullite, the first oxide comprises silicon oxide and the second oxide comprises aluminum oxide, ~~The method of Claim 16,~~ wherein the insulating material comprises between about 25% mullite and 50% mullite by weight.

18. (Currently Amended) A method of fabricating trench isolation structures between integrated electrical devices in a semiconductor substrate, comprising:

placing a semiconductor substrate in a reaction chamber, the semiconductor substrate comprising trenches; and

completely filling the trenches with insulating material by atomic layer deposition to form a trench isolation structure, the atomic layer deposition process comprising a plurality of primary cycles, each primary cycle comprising, in sequence:

introducing a first vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a first reactant species conforming at least to surfaces of the trenches;

removing excess first vapor-phase reactant and byproduct from the reaction chamber;

introducing a second vapor-phase reactant to the substrate, thereby reacting with the first reactant species conforming at least to the surfaces of the trenches; and

removing excess second vapor-phase reactant and byproduct from the reaction chamber

filling the trenches further comprises a plurality of secondary cycles, each secondary cycle comprising, in sequence:

introducing a third vapor-phase reactant to the substrate, thereby forming no more than about one monolayer of a third reactant species conforming at least to surfaces of the trenches, the third reactant species being different from the first reactant species;

removing excess third vapor-phase reactant and byproduct from the reaction chamber;

introducing a fourth vapor-phase reactant to the substrate, thereby reacting with the third reactant species conforming at least to the surfaces of the trenches; and

removing excess fourth vapor-phase reactant and byproduct from the reaction chamber

wherein the primary cycles deposit a first oxide species and the secondary cycles deposit a second oxide species, ~~The method of Claim 10,~~ wherein the primary and secondary cycles are mixed in a ratio to match a coefficient of thermal expansion (CTE) of the insulating material to within about 20% of a CTE of the semiconductor substrate.

19. (Previously presented) The method of Claim 18, wherein the primary and secondary cycles are mixed in a ratio to match a coefficient of thermal expansion (CTE) of the insulating material to within about 10% of a CTE of the semiconductor substrate.

20. - 58. (Cancelled)

## SUMMARY OF INTERVIEW

Applicants wish to thank the Examiner for the opportunity to discuss the present application in a personal interview conducted on May 5, 2004 at Examiner Mai's office.

Identification of Claims Discussed

Claims 1 and 6-19.

Identification of Prior Art Discussed

U.S. Patent No. 6,203,613 and Ritala et al.

Proposed Amendments

Rewriting Claims 13 and 17-18.

Principal Arguments and Other Matters

The principle arguments centered around the criticality of limitations in the above-identified claims.

Results of Interview

It was agreed that the Applicants should rewrite the discussed claims in independent form in a written response and argue criticality.